

# Exp#4: LabVIEW with Arduino using LINX

## What is LINX Toolkit?

LINX is an open source project by Digilent and is designed to make it easy to develop embedded applications using LabVIEW. LINX includes VIs for over 30 of the most common embedded sensors as well as hardware agnostic APIs for accessing peripherals like digital I/O, analog I/O, PWM, I2C, SPI, and UART. By using LINX toolkit, developers can acquire data from microcontroller and process it in the LabVIEW Graphical Programming environment.

## Why LINX?

There are many reasons LabVIEW makes you more productive when using Arduino:

- Interact with your system through a graphical user interface.
- Streamline your design process with intuitive graphical programming.
- Improve your debugging experience with interactive tools.
- Leverage built in resources/functions for implementing simple to complex tasks.
- Open API allows for complete customization -- customize your programs to fit your application.

## Introduction

In the previous, there was a toolkit called LIFA (LabView Interface For Arduino). The author of LIFA decided to expand the interface to more devices (and make other improvements). So, a few years ago, LIFA was replaced by LINX ("LabVIEW INterface for X"; where X stands for the various devices that it supports like Arduino, chipKIT, etc.). In addition, LINX is solved many problems that were in LIFA, so there were significant communication efficiency improvements because the protocol was redesigned so most of the functions that communicate with the device are much more efficient.





Figure. 2

Then click Next and select Arduino port:

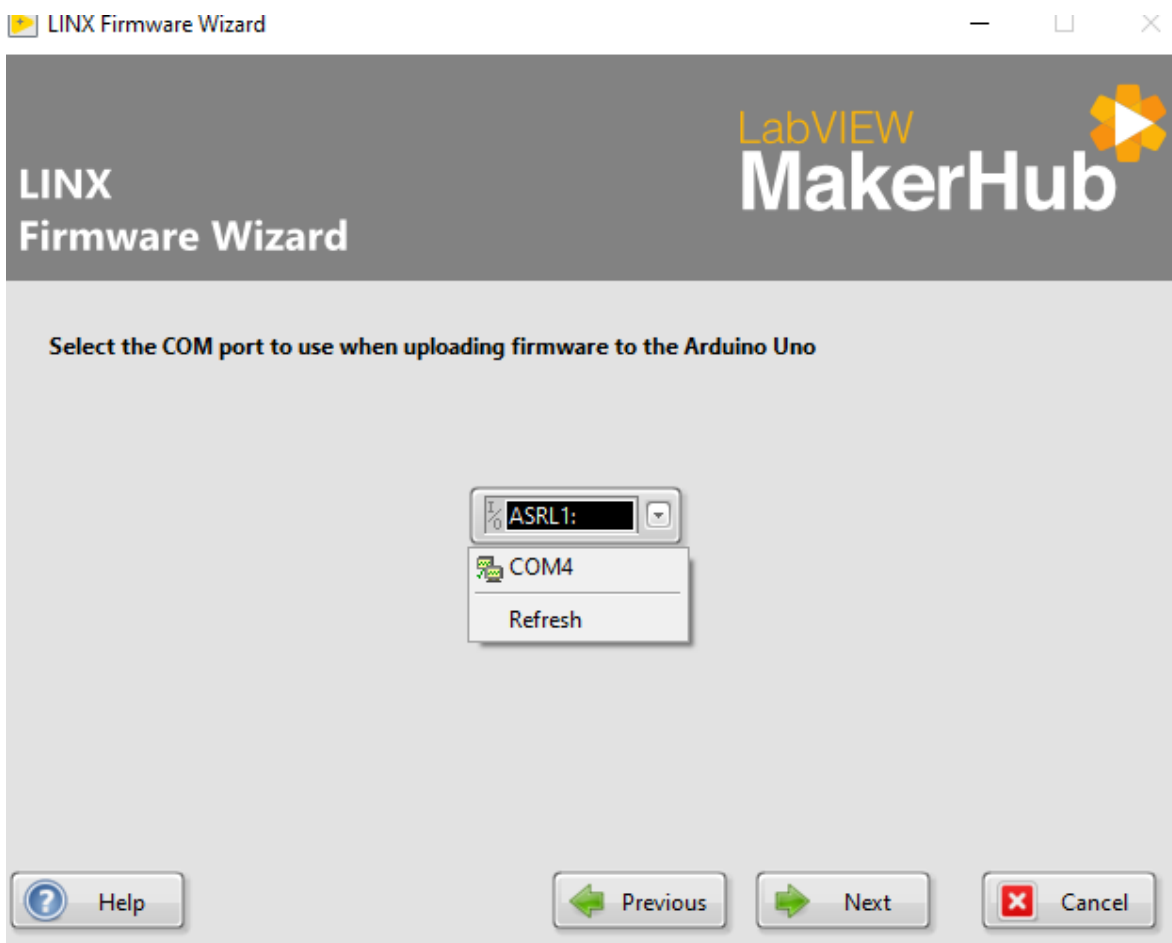


Figure.3

Then click Next:

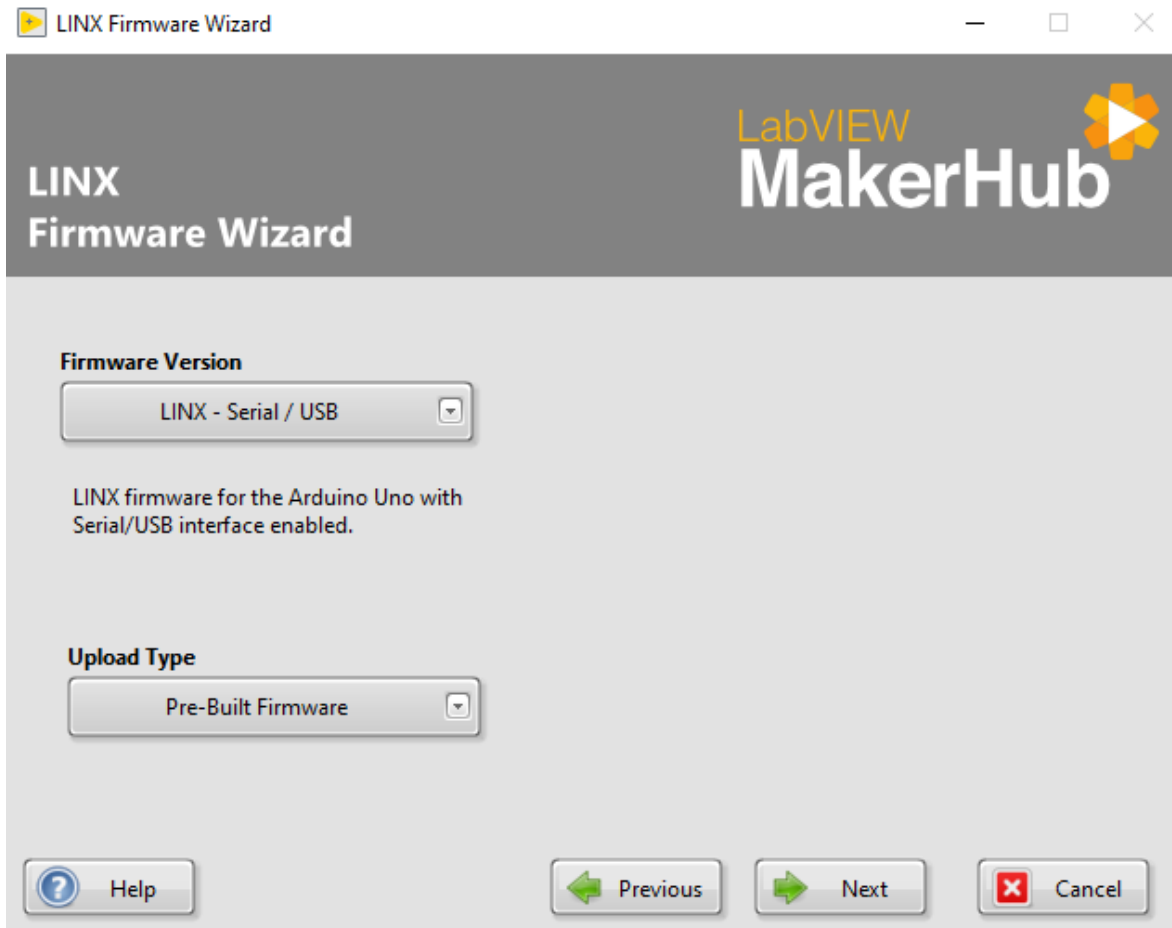
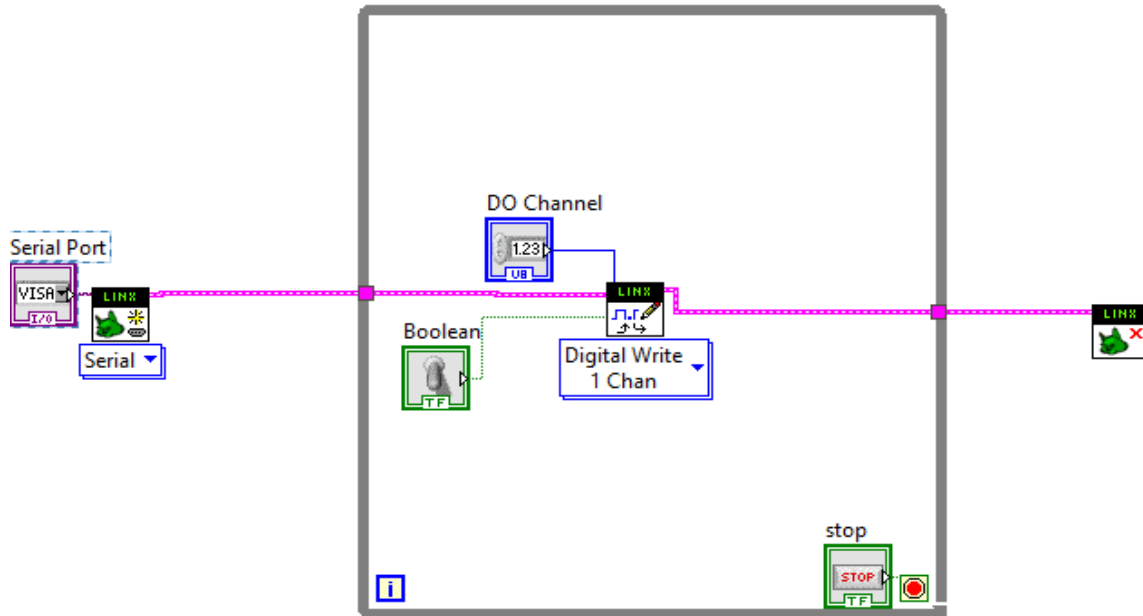


Figure. 4

After that LINX will start to make the connection. Once this step done, press finish and now you are ready to use Arduino with LabView.

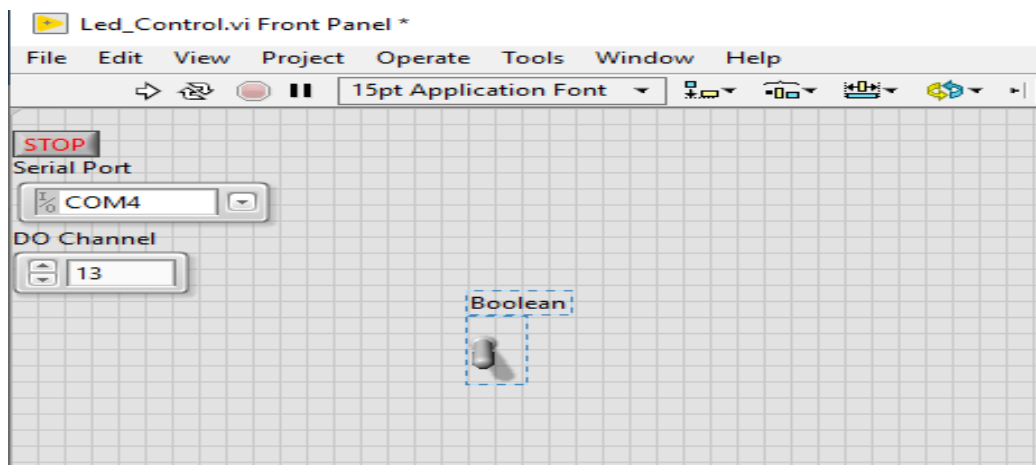
## Procedures

### A. Control LED 13 in Arduino by LabView.



In this example, we will control LED 13 in Arduino by using LabView, so as shown in the figure above, we used a digital write box that has three inputs, the first input comes from init box, this input used to know that the initialization done successfully, the second input is a channel number, in other word, the digital port that we need to write on it, and the last input is a switch in order to control the led.

The front-end side will look like this:



## B.Array example

In this example you will be use two binary arrays in as indicator and the other as control.

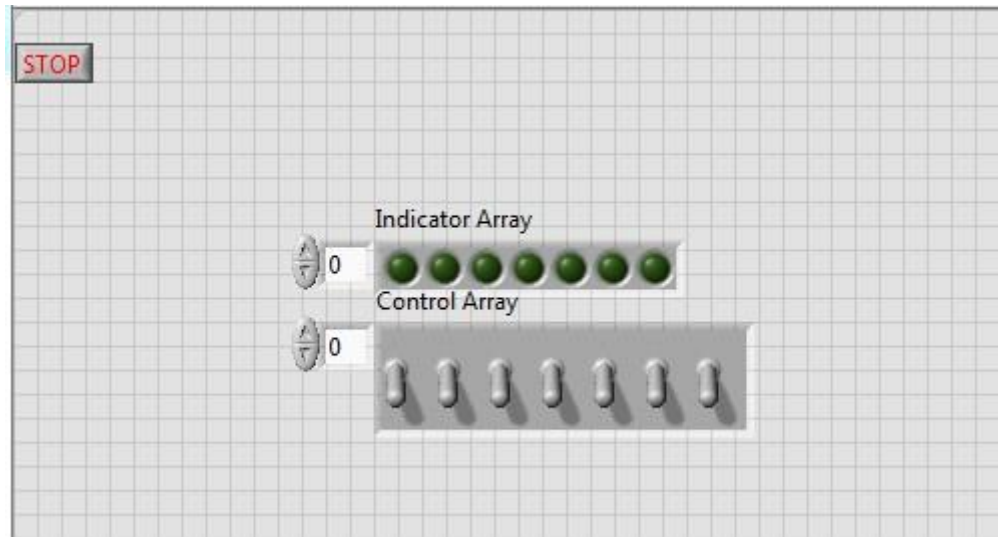


Figure.3 array example

- ☒ To add array: **Front panel >> Modern >> Array, Matrix >> array.**
- ☒ To make it a control binary array drags and drops a switch in it.
- ☒ To make it an indicator binary array drags and drops a switch in it.
- ☒ To re size the array graphically.

## C. Read analog value (LDR)

Build the following LDR voltage divider circuit in to read its output voltage using arduino and print it out on the labview.

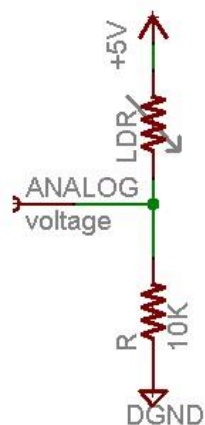


Figure.4 LDR voltage divider

Connect the output voltage of the LDR voltage divider circuit to analog bin 0 of Adriano. Then build the following example.

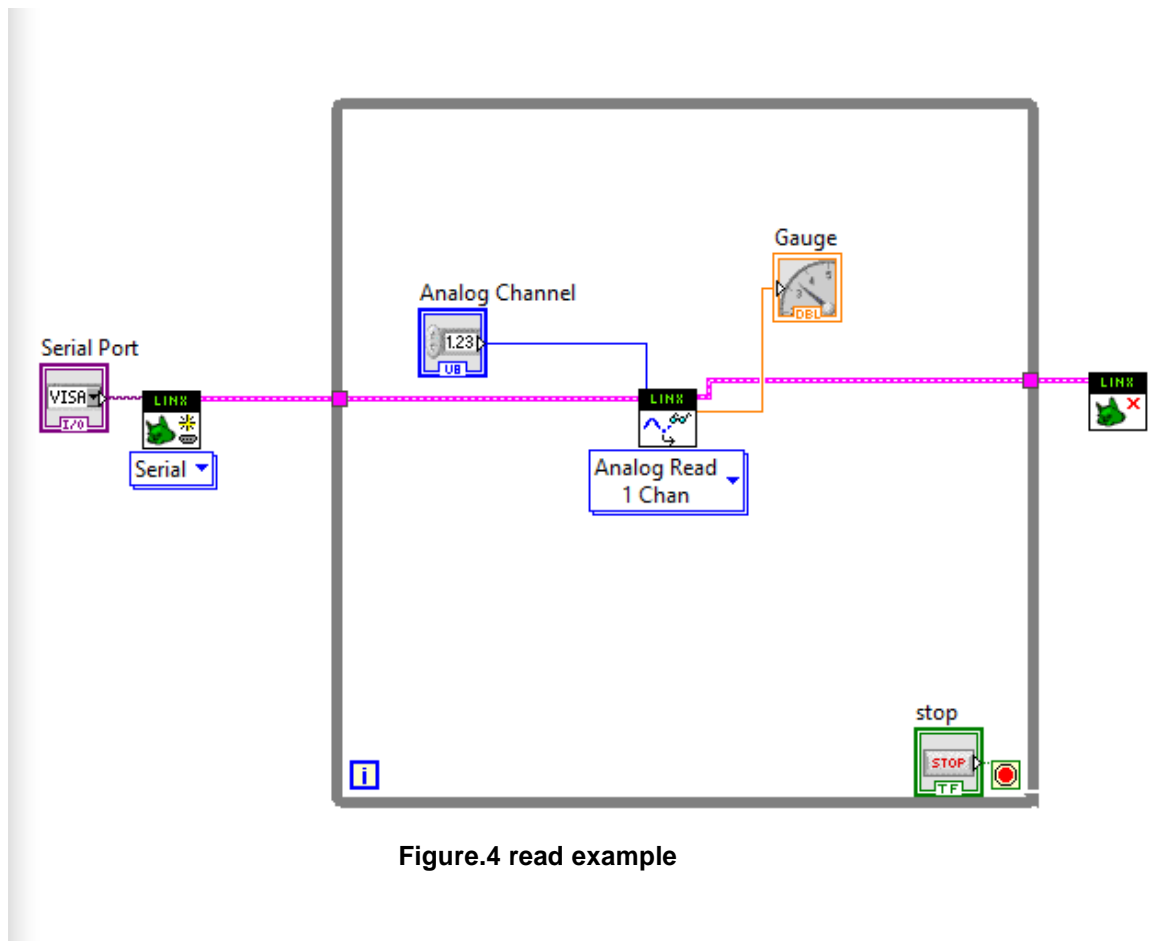


Figure.4 read example

To add the “init, close, and read analog pin” block diagram >>LINX.

**TODO:** Lights detection security key (LDSK)

In this part You have to build a 12 bits light detection security key using a LDR with **Arduino and Labview** , where you will insert the password using the LDR if it detects a light it will be a one otherwise it will be zero.

- ❑ Use for loop to get the data from arduino and store them in binary array.
- ❑ One bit every second.
- ❑ System needs a trigger to start reading. (you can use a Ok button with casestructure).
- ❑ If the password is correct, then a green light is on. Else a red one is on.

### **Lab Report:**

1. Report as described in the Lab Policies.
2. Screen Shots of the “Block Diagram” and “Front Panel” windows where only these windows and their title bars and nothing else are visible. Points will be deducted if the components are not clearly visible in these windows or if any of the Windows screen components like the “Start Button” or “Task Bar” are visible.